FIG. 1

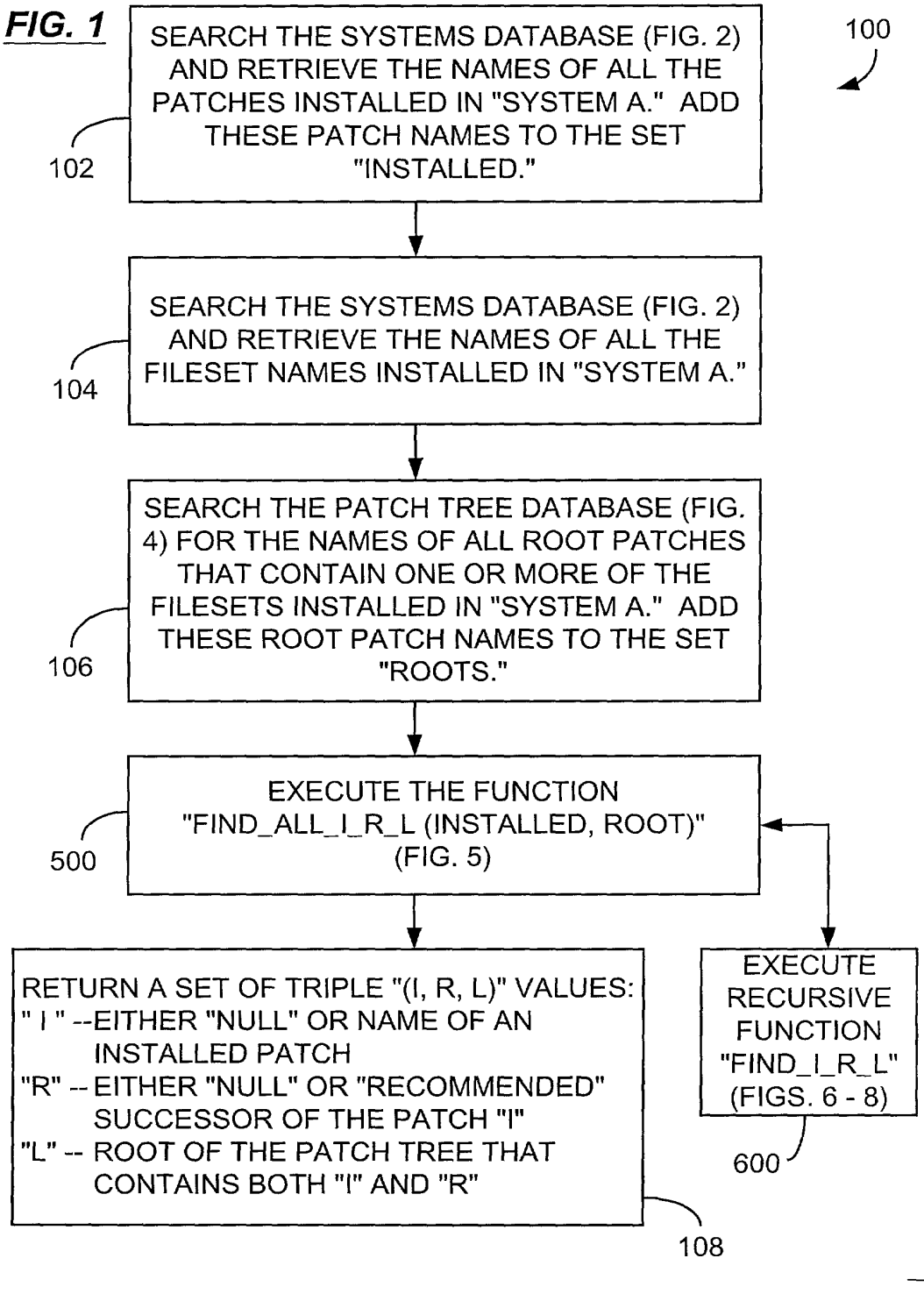

100
SEARCH THE SYSTEMS DATABASE (FIG. 2) AND RETRIEVE THE NAMES OF ALL THE PATCHES INSTALLED IN "SYSTEM A." ADD THESE PATCH NAMES TO THE SET "INSTALLED."
102
SEARCH THE SYSTEMS DATABASE (FIG. 2) AND RETRIEVE THE NAMES OF ALL THE FILESET NAMES INSTALLED IN "SYSTEM A."
104
SEARCH THE PATCH TREE DATABASE (FIG. 4) FOR THE NAMES OF ALL ROOT PATCHES THAT CONTAIN ONE OR MORE OF THE FILESETS INSTALLED IN "SYSTEM A." ADD THESE ROOT PATCH NAMES TO THE SET "ROOTS."
106
EXECUTE THE FUNCTION "FIND_ALL_I_R_L (INSTALLED, ROOT)" (FIG. 5)
500
RETURN A SET OF TRIPLE "(I, R, L)" VALUES:
" I " --EITHER "NULL" OR NAME OF AN INSTALLED PATCH
"R" -- EITHER "NULL" OR "RECOMMENDED" SUCCESSOR OF THE PATCH "I"
"L" -- ROOT OF THE PATCH TREE THAT CONTAINS BOTH "I" AND "R"
108
EXECUTE RECURSIVE FUNCTION "FIND_I_R_L" (FIGS. 6 - 8)
600

FIG. 2

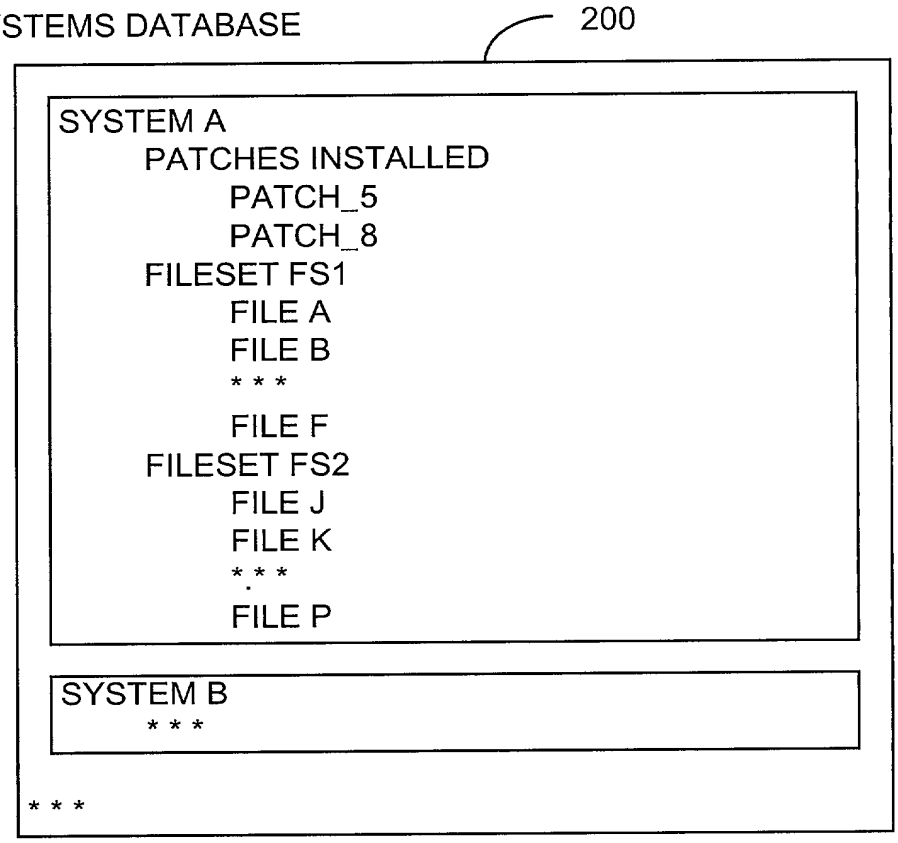
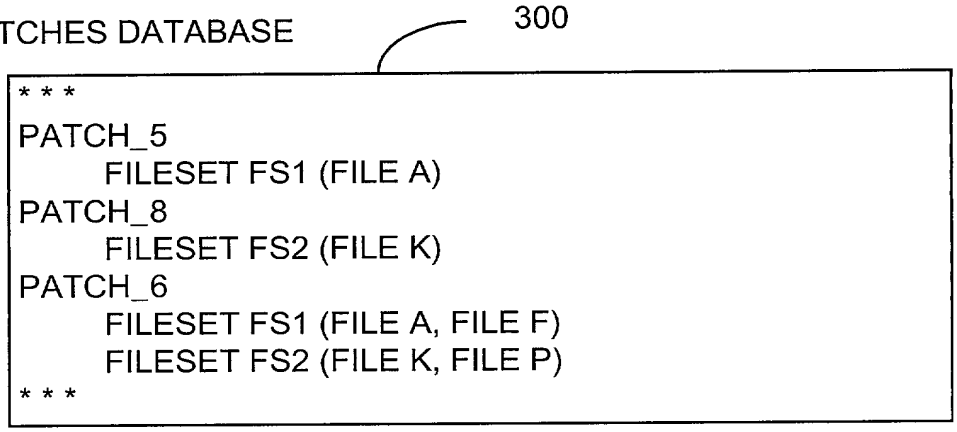

SYSTEMS DATABASE
200
SYSTEM A
PATCHES INSTALLED
PATCH_5
PATCH_8
FILESET FS1
FILE A
FILE B
* * *
FILE F
FILESET FS2
FILE J
FILE K
* * *
FILE P
SYSTEM B
* * *
* * *

FIG. 3


PATCHES DATABASE
300
* * *
PATCH_5
FILESET FS1 (FILE A)
PATCH_8
FILESET FS2 (FILE K)
PATCH_6
FILESET FS1 (FILE A, FILE F)
FILESET FS2 (FILE K, FILE P)
* * *

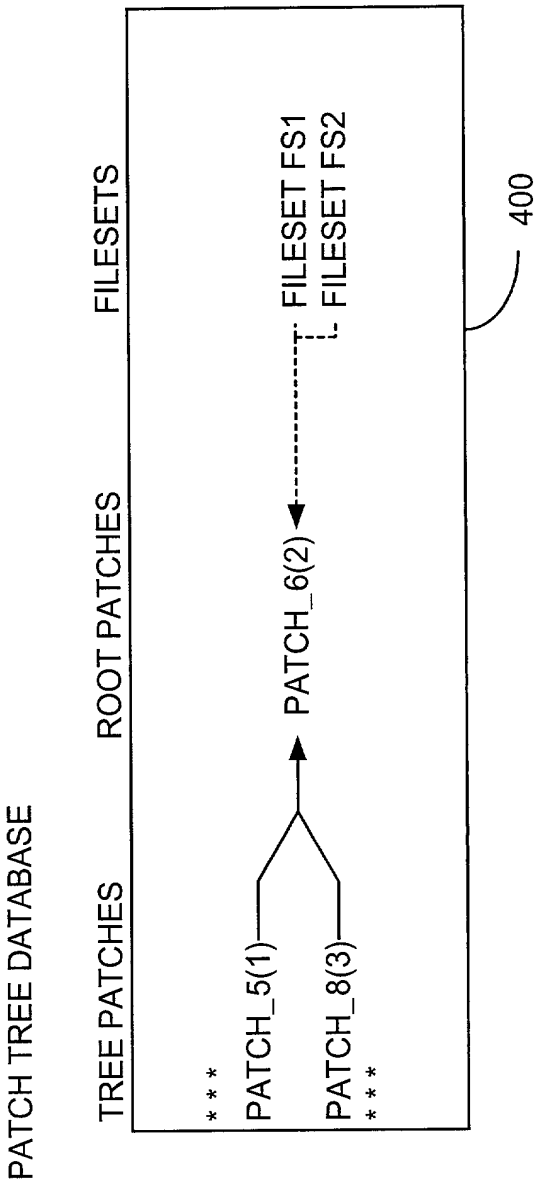

PATCH TREE DATABASE
TREE PATCHES
ROOT PATCHES
FILESETS
400
FILESET FS1
FILESET FS2
PATCH_6(2)
PATCH_5(1)
PATCH_8(3)
* * *
* * *

FIG. 4

FIG. 5

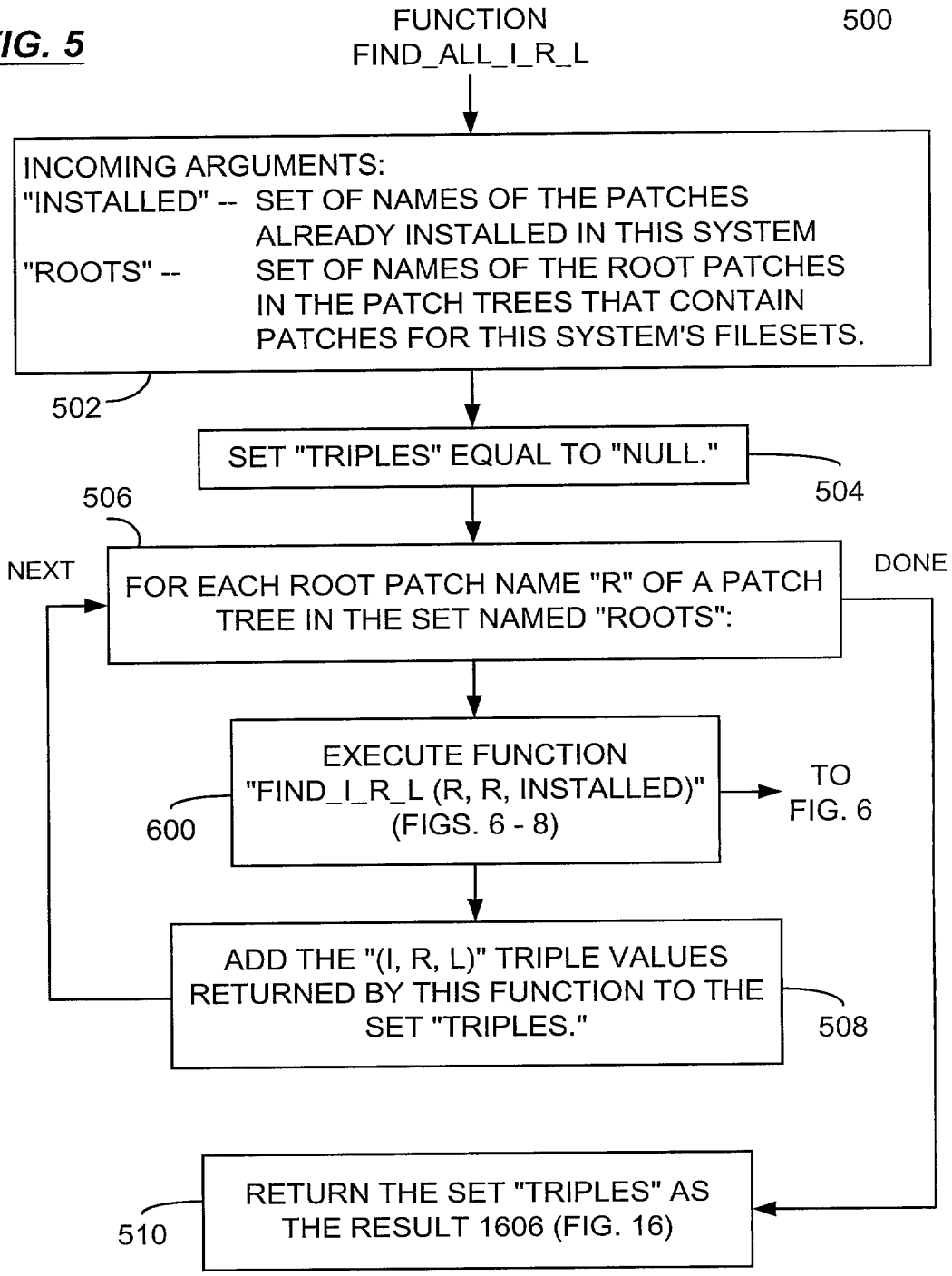

FUNCTION
FIND_ALL_I_R_L
500
INCOMING ARGUMENTS:
"INSTALLED" -- SET OF NAMES OF THE PATCHES ALREADY INSTALLED IN THIS SYSTEM
"ROOTS" -- SET OF NAMES OF THE ROOT PATCHES IN THE PATCH TREES THAT CONTAIN PATCHES FOR THIS SYSTEM'S FILESETS.
502
SET "TRIPLES" EQUAL TO "NULL."
504
506
NEXT
FOR EACH ROOT PATCH NAME "R" OF A PATCH TREE IN THE SET NAMED "ROOTS":
DONE
EXECUTE FUNCTION "FIND_I_R_L (R, R, INSTALLED)" (FIGS. 6 - 8)
600
TO FIG. 6
ADD THE "(I, R, L)" TRIPLE VALUES RETURNED BY THIS FUNCTION TO THE SET "TRIPLES."
508
RETURN THE SET "TRIPLES" AS THE RESULT 1606 (FIG. 16)
510

FIG. 6

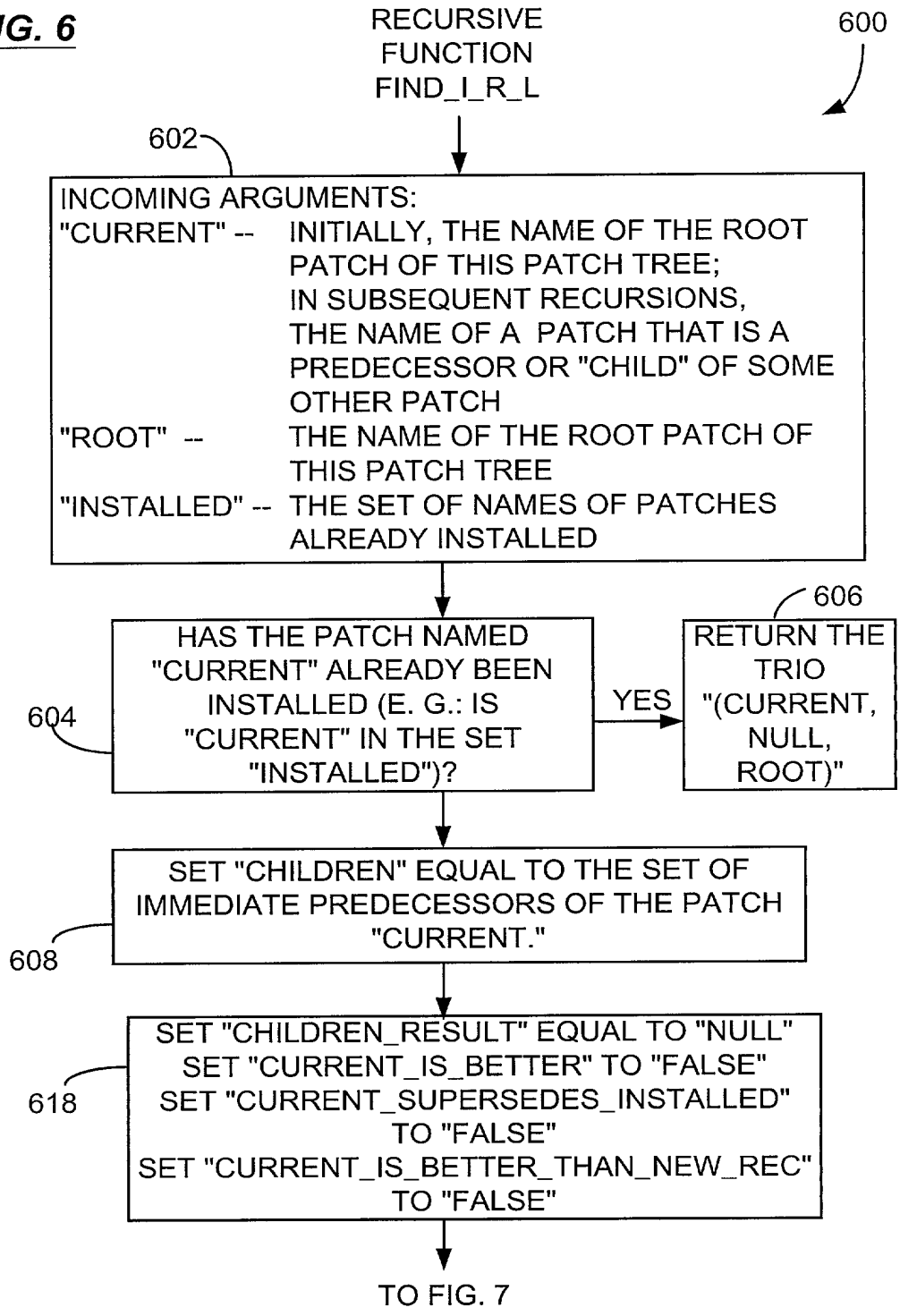

RECURSIVE FUNCTION FIND_I_R_L
600
602
INCOMING ARGUMENTS:
"CURRENT" -- INITIALLY, THE NAME OF THE ROOT PATCH OF THIS PATCH TREE; IN SUBSEQUENT RECURSIONS, THE NAME OF A PATCH THAT IS A PREDECESSOR OR "CHILD" OF SOME OTHER PATCH
"ROOT" -- THE NAME OF THE ROOT PATCH OF THIS PATCH TREE
"INSTALLED" -- THE SET OF NAMES OF PATCHES ALREADY INSTALLED
HAS THE PATCH NAMED "CURRENT" ALREADY BEEN INSTALLED (E. G.: IS "CURRENT" IN THE SET "INSTALLED")?
604
YES
606
RETURN THE TRIO "(CURRENT, NULL, ROOT)"
SET "CHILDREN" EQUAL TO THE SET OF IMMEDIATE PREDECESSORS OF THE PATCH "CURRENT."
608
SET "CHILDREN_RESULT" EQUAL TO "NULL"
SET "CURRENT_IS_BETTER" TO "FALSE"
SET "CURRENT_SUPERSEDES_INSTALLED" TO "FALSE"
SET "CURRENT_IS_BETTER_THAN_NEW_REC" TO "FALSE"
618
TO FIG. 7

FIG. 7

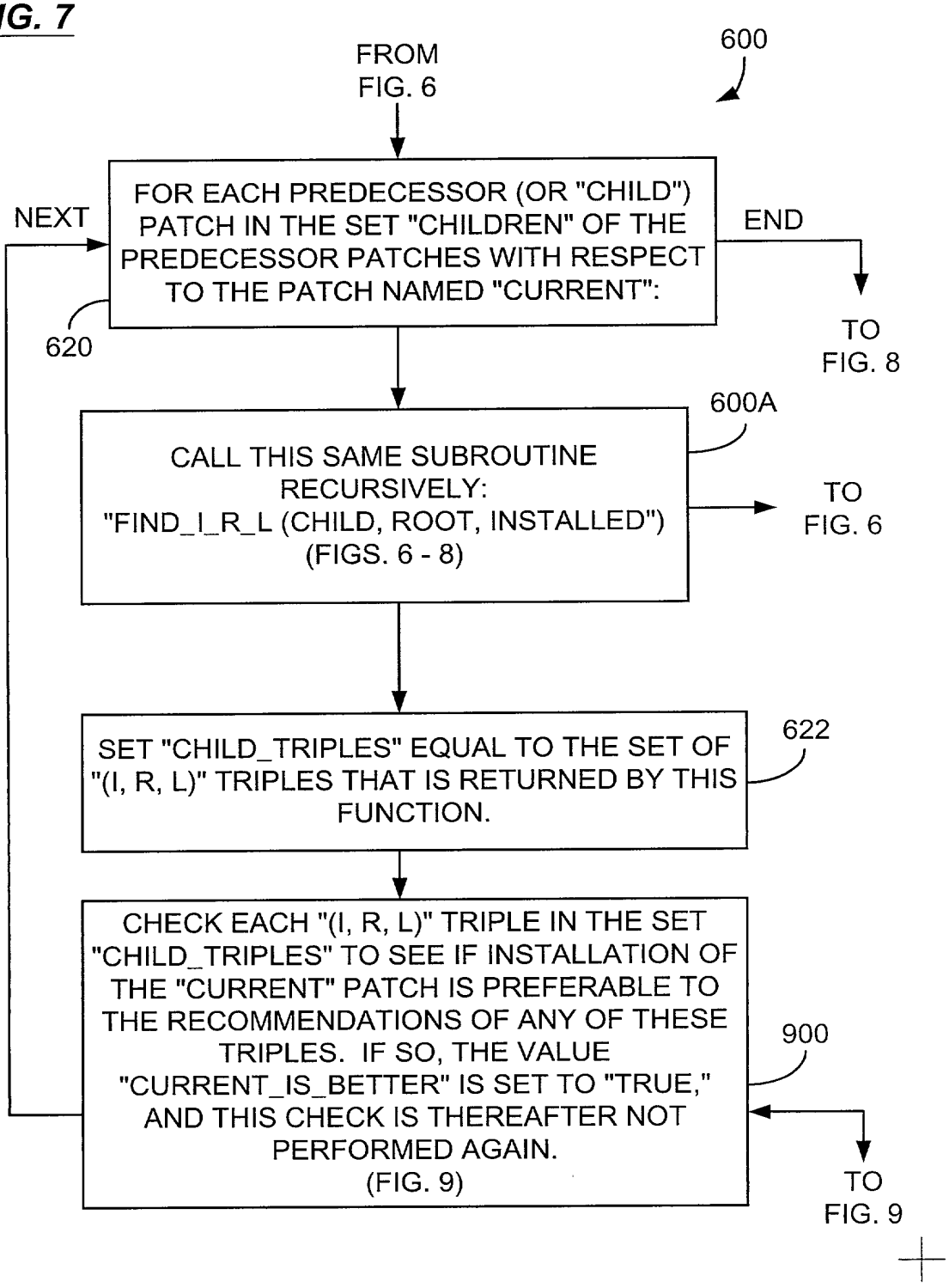

FROM FIG. 6
600
FOR EACH PREDECESSOR (OR "CHILD") PATCH IN THE SET "CHILDREN" OF THE PREDECESSOR PATCHES WITH RESPECT TO THE PATCH NAMED "CURRENT":
NEXT
END
620
TO FIG. 8
600A
CALL THIS SAME SUBROUTINE RECURSIVELY:
"FIND_I_R_L (CHILD, ROOT, INSTALLED")
(FIGS. 6 - 8)
TO FIG. 6
SET "CHILD_TRIPLES" EQUAL TO THE SET OF "(I, R, L)" TRIPLES THAT IS RETURNED BY THIS FUNCTION.
622
CHECK EACH "(I, R, L)" TRIPLE IN THE SET "CHILD_TRIPLES" TO SEE IF INSTALLATION OF THE "CURRENT" PATCH IS PREFERABLE TO THE RECOMMENDATIONS OF ANY OF THESE TRIPLES. IF SO, THE VALUE "CURRENT_IS_BETTER" IS SET TO "TRUE," AND THIS CHECK IS THEREAFTER NOT PERFORMED AGAIN.
(FIG. 9)
900
TO FIG. 9

FIG. 8

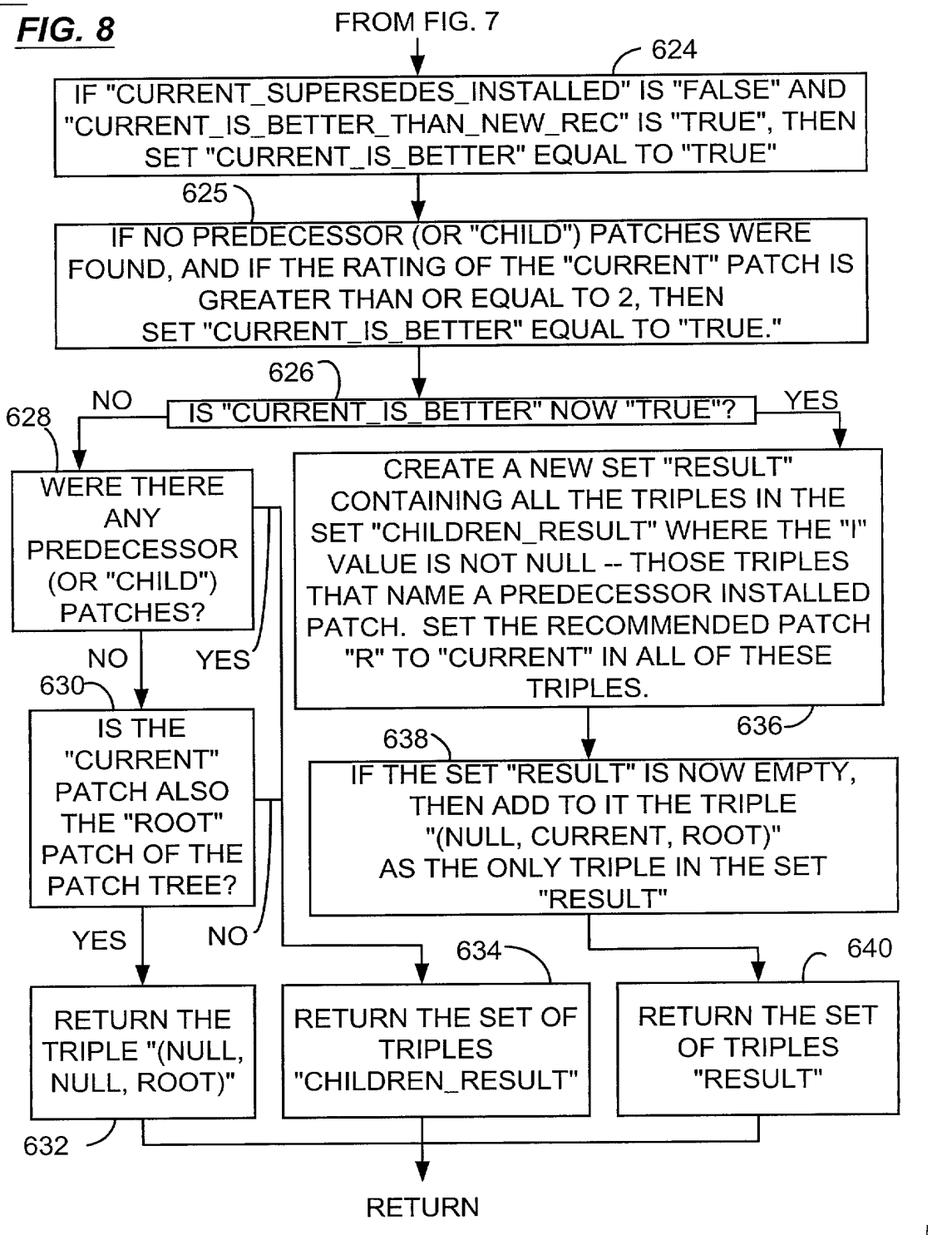

FROM FIG. 7
624
IF "CURRENT_SUPERSEDES_INSTALLED" IS "FALSE" AND "CURRENT_IS_BETTER_THAN_NEW_REC" IS "TRUE", THEN SET "CURRENT_IS_BETTER" EQUAL TO "TRUE"
625
IF NO PREDECESSOR (OR "CHILD") PATCHES WERE FOUND, AND IF THE RATING OF THE "CURRENT" PATCH IS GREATER THAN OR EQUAL TO 2, THEN SET "CURRENT_IS_BETTER" EQUAL TO "TRUE."
626
IS "CURRENT_IS_BETTER" NOW "TRUE"?
NO
YES
628
WERE THERE ANY PREDECESSOR (OR "CHILD") PATCHES?
NO
YES
630
IS THE "CURRENT" PATCH ALSO THE "ROOT" PATCH OF THE PATCH TREE?
YES
NO
CREATE A NEW SET "RESULT" CONTAINING ALL THE TRIPLES IN THE SET "CHILDREN_RESULT" WHERE THE "I" VALUE IS NOT NULL -- THOSE TRIPLES THAT NAME A PREDECESSOR INSTALLED PATCH. SET THE RECOMMENDED PATCH "R" TO "CURRENT" IN ALL OF THESE TRIPLES.
636
638
IF THE SET "RESULT" IS NOW EMPTY, THEN ADD TO IT THE TRIPLE "(NULL, CURRENT, ROOT)" AS THE ONLY TRIPLE IN THE SET "RESULT"
634
640
RETURN THE TRIPLE "(NULL, NULL, ROOT)"
RETURN THE SET OF TRIPLES "CHILDREN_RESULT"
RETURN THE SET OF TRIPLES "RESULT"
632
RETURN

FIG. 9

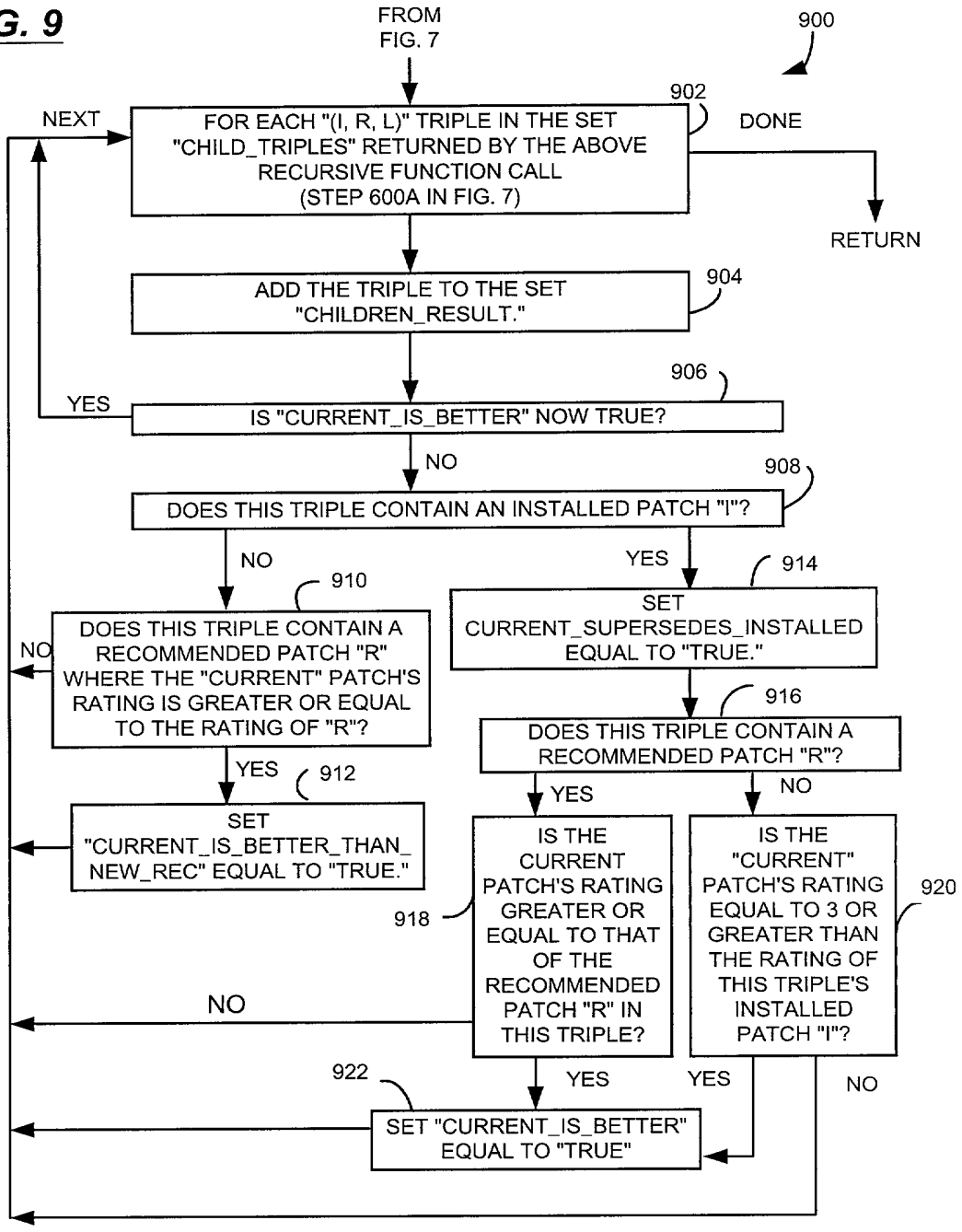

FROM FIG. 7
900
902
NEXT
FOR EACH "(I, R, L)" TRIPLE IN THE SET "CHILD_TRIPLES" RETURNED BY THE ABOVE RECURSIVE FUNCTION CALL (STEP 600A IN FIG. 7)
DONE
RETURN
904
ADD THE TRIPLE TO THE SET "CHILDREN_RESULT."
906
YES
IS "CURRENT_IS_BETTER" NOW TRUE?
NO
908
DOES THIS TRIPLE CONTAIN AN INSTALLED PATCH "I"?
NO
YES
910
DOES THIS TRIPLE CONTAIN A RECOMMENDED PATCH "R" WHERE THE "CURRENT" PATCH'S RATING IS GREATER OR EQUAL TO THE RATING OF "R"?
NO
914
SET CURRENT_SUPERSEDES_INSTALLED EQUAL TO "TRUE."
916
DOES THIS TRIPLE CONTAIN A RECOMMENDED PATCH "R"?
YES
NO
912
YES
SET "CURRENT_IS_BETTER_THAN_NEW_REC" EQUAL TO "TRUE."
IS THE CURRENT PATCH'S RATING GREATER OR EQUAL TO THAT OF THE RECOMMENDED PATCH "R" IN THIS TRIPLE?
918
IS THE "CURRENT" PATCH'S RATING EQUAL TO 3 OR GREATER THAN THE RATING OF THIS TRIPLE'S INSTALLED PATCH "I"?
920
NO
922
YES
YES
NO
SET "CURRENT_IS_BETTER" EQUAL TO "TRUE"

FIG. 10

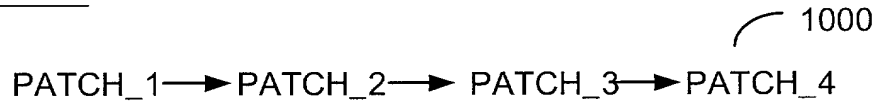


FIG. 11

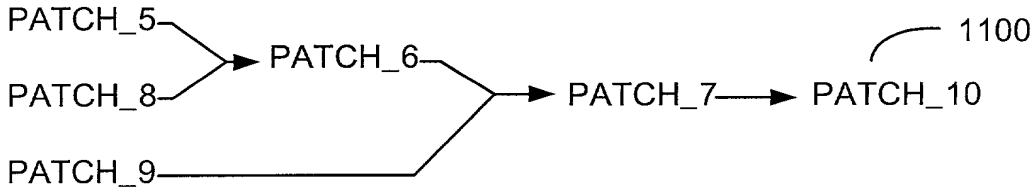
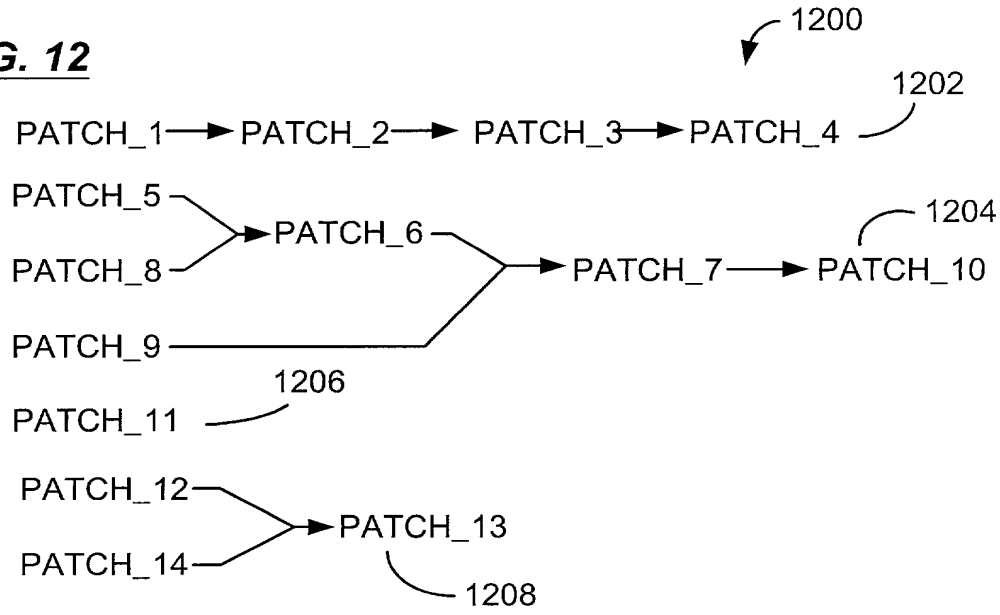


FIG. 12



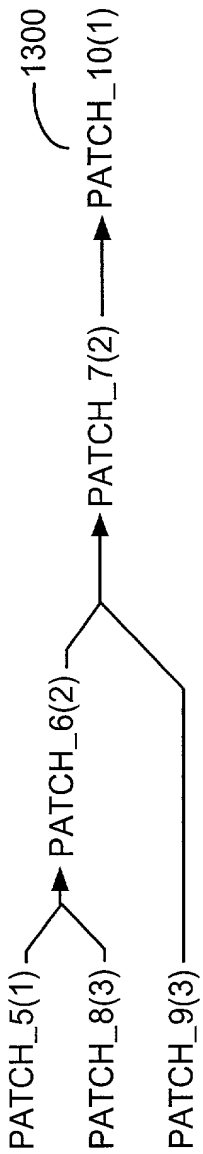


FIG. 13

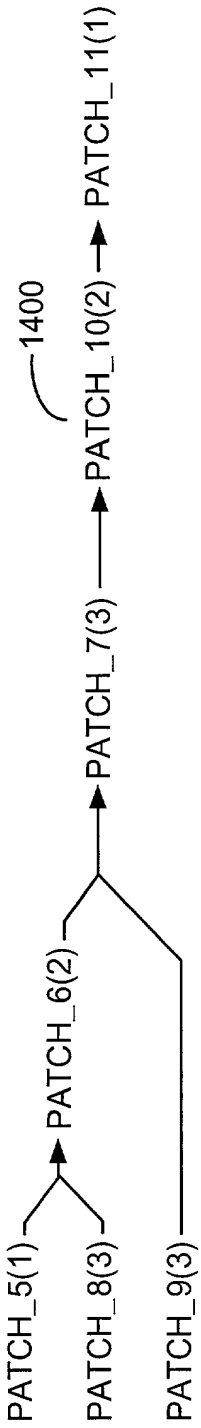


FIG. 14

FIG. 15

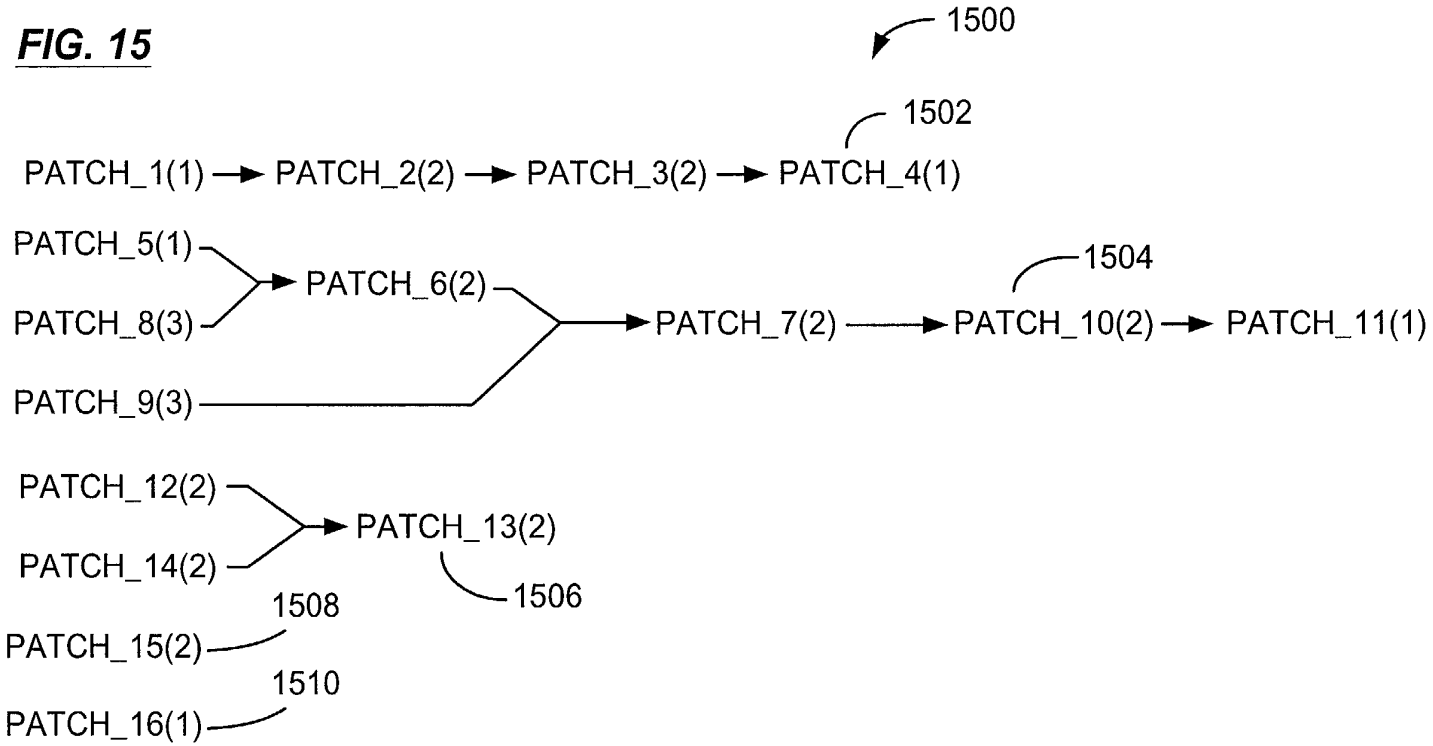

1500
1502
PATCH_1(1)
PATCH_2(2)
PATCH_3(2)
PATCH_4(1)
PATCH_5(1)
PATCH_8(3)
PATCH_6(2)
1504
PATCH_7(2)
PATCH_10(2)
PATCH_11(1)
PATCH_9(3)
PATCH_12(2)
PATCH_14(2)
PATCH_13(2)
1506
1508
PATCH_15(2)
1510
PATCH_16(1)

FIG. 16

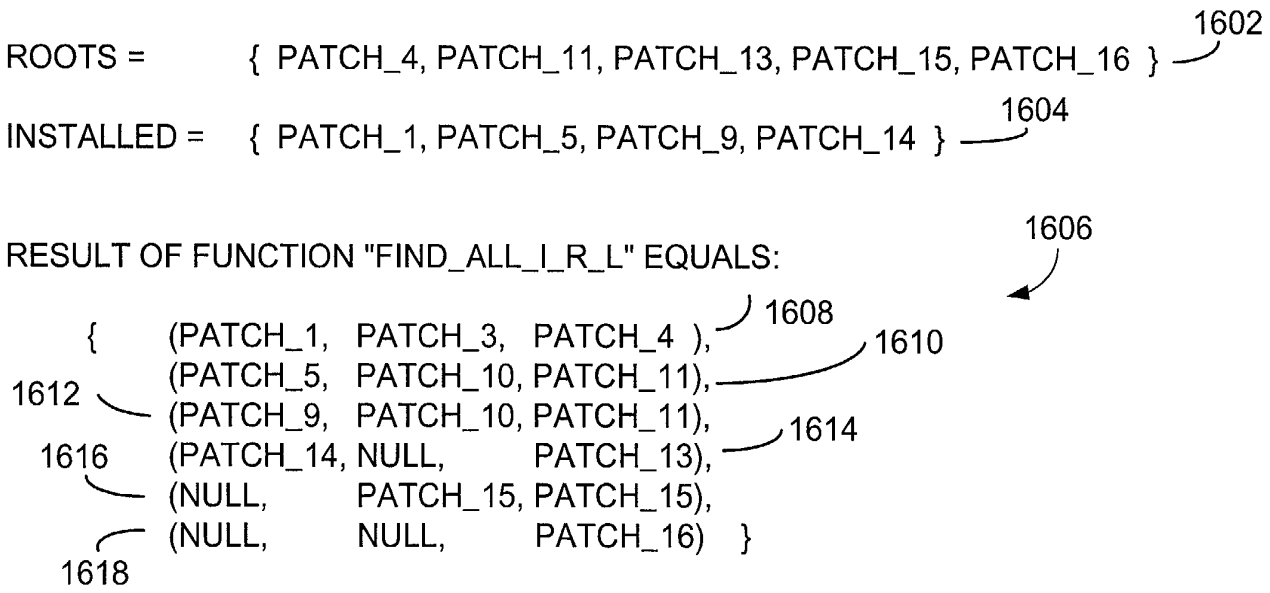

ROOTS = { PATCH_4, PATCH_11, PATCH_13, PATCH_15, PATCH_16 }
1602
INSTALLED = { PATCH_1, PATCH_5, PATCH_9, PATCH_14 }
1604
RESULT OF FUNCTION "FIND_ALL_I_R_L" EQUALS:
1606
{ (PATCH_1, PATCH_3, PATCH_4),
1608
(PATCH_5, PATCH_10, PATCH_11),
1610
1612
(PATCH_9, PATCH_10, PATCH_11),
(PATCH_14, NULL, PATCH_13),
1614
1616
(NULL, PATCH_15, PATCH_15),
(NULL, NULL, PATCH_16) }
1618

FIG. 17

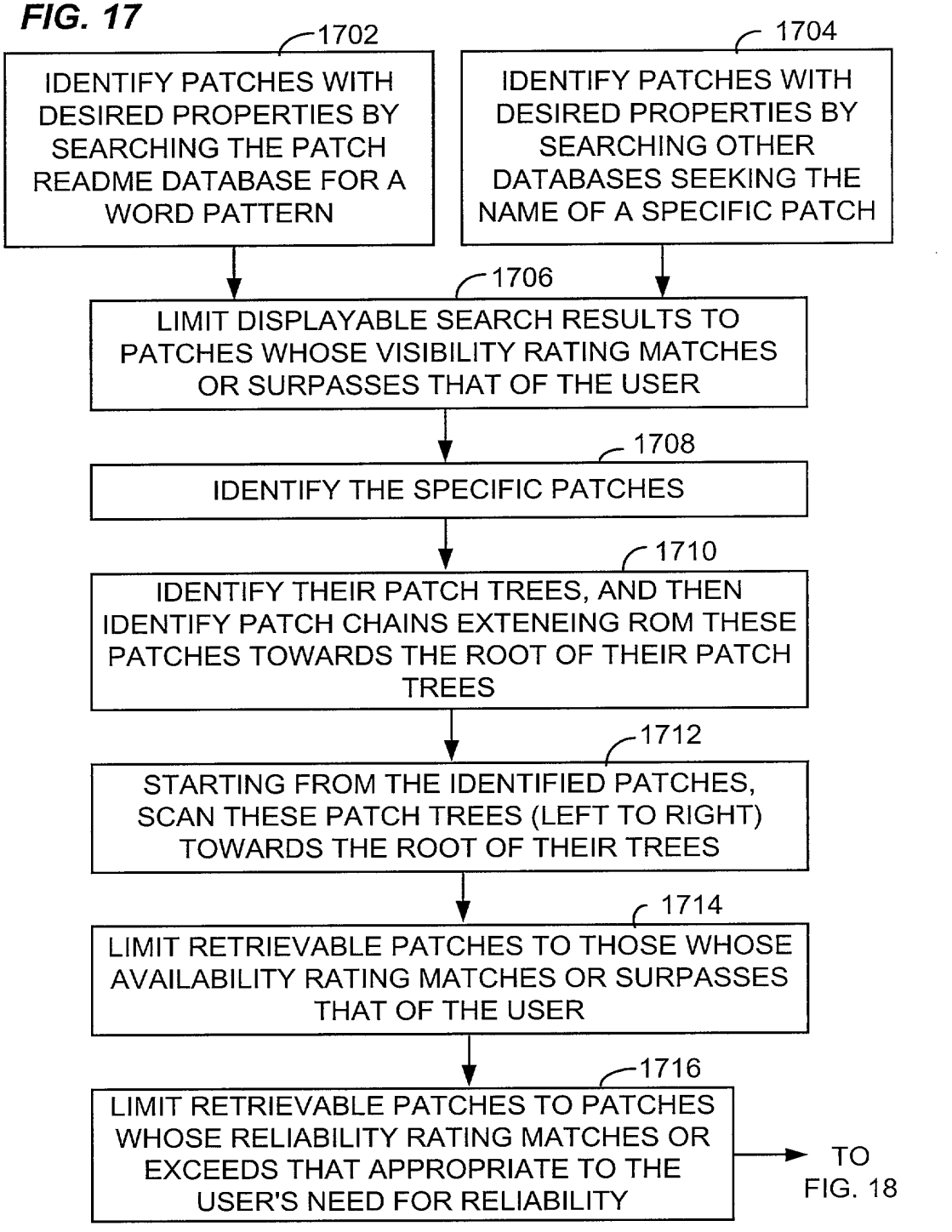
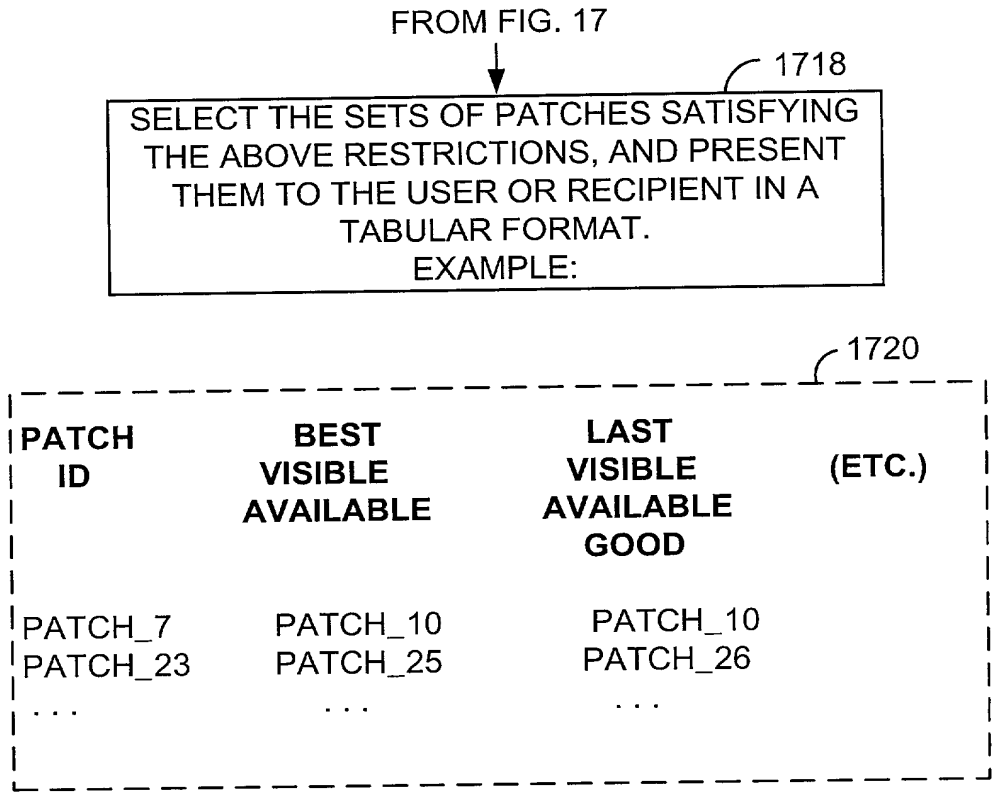


FIG. 18


FROM FIG. 17
1718
SELECT THE SETS OF PATCHES SATISFYING THE ABOVE RESTRICTIONS, AND PRESENT THEM TO THE USER OR RECIPIENT IN A TABULAR FORMAT.
EXAMPLE:
1720
PATCH ID
BEST VISIBLE AVAILABLE
LAST VISIBLE AVAILABLE GOOD
(ETC.)
PATCH_7
PATCH_23
. . .
PATCH_10
PATCH_25
. . .
PATCH_10
PATCH_26
. . .